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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/521,566	01/18/2005	William Holm	0104-0499PUS1	9005
2292 7590 04/30/2008 BIRCH STEWART KOLASCH & BIRCH PO BOX 747 FALLS CHURCH, VA 22040-0747				
EXAMINER				
HORNING, JOEL G				
ART UNIT		PAPER NUMBER		
4172				
NOTIFICATION DATE		DELIVERY MODE		
04/30/2008		ELECTRONIC		

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

mailroom@bskb.com

# Office Action Summary

**Application No.**

10/521,566

**Applicant(s)**

HOLM ET AL.

**Examiner**

JOEL HORNING

**Art Unit**

4172

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 18 January 2005.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 is/are pending in the application.
- 4a) Of the above claim(s) 26-37 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-25 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 18 January 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-8508)
- 4) ☐ Interview Summary (PTO-413)
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date 01-18-2005, 05-25-2005

**DETAILED ACTION**

***Election/Restrictions***

1. Restriction is required under 35 U.S.C. 121 and 372.

This application contains the following inventions or groups of inventions which are not so linked as to form a single general inventive concept under PCT Rule 13.1.

In accordance with 37 CFR 1.499, applicant is required, in reply to this action, to elect a single invention to which the claims must be restricted.

Group I, claim(s) 1-25, drawn to a method of jetting droplets of a viscous medium onto a substrate.

Group II, claim(s) 26-37, drawn to a system comprising: a jetting nozzle, a feeder, an impacting device, and a control unit.

2. The inventions listed as Groups I and II do not relate to a single general inventive concept under PCT Rule 13.1 because, under PCT Rule 13.2, they lack the same or corresponding special technical features for the following reasons:

Lack of unity of invention may be directly evident "a priori," that is, before considering the claims in relation to any prior art, for example, independent claims to A + X, A + Y, X + Y can be said to lack unity a priori as there is no subject matter common to all claims.

In instant case, the invention of Group I is drawn to a method of jetting droplets of viscous medium onto a substrate. Whereas the invention of group II is drawn to a system for jetting droplets of viscous medium onto a substrate. Since there is no subject matter common to all groups, the restriction is proper for the reasons set forth above where lack of unity of invention is evident "a priori."

3. During a telephone conversation with Cheng-Kang Hsu on April 17, 2008, a provisional election was made to prosecute the invention I, claims 1-25. Affirmation of this election must be made by applicant in replying to this Office action. Claims 26-37 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

***Priority***

4. Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

***Claim Rejections - 35 USC § 112***

5. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

6. Claims 8, 11 and 20 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

The term "slowly" in claim 8 is a relative term which renders the claim indefinite. The term "slowly" is not defined by the claim, and the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear what rate of moving the impact end constitutes it being moved "slowly". Therefore, one would not know what the metes and bounds of the claims are.

The phrase "kept at a minimum" in claim 11 is a relative phrase which renders the claim indefinite. The phrase "kept at a minimum" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear what amount of excess flow corresponds to being "kept at a minimum". Therefore, one would not know what the metes and bounds of the claims are.

The term "substantially" in claim 20 is a relative term which renders the claim indefinite. The term "substantially" is not defined by the claim, the specification does not provide a standard for ascertaining the requisite degree, and one of ordinary skill in the art would not be reasonably apprised of the scope of the invention. It is not clear what degree of variation constitutes being "substantially constant". Therefore, one would not know what the metes and bounds of the claims are.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

8. Claims 1-2, 4-7, 9, 10, 12 and 19 are rejected under 35 U.S.C. 102(b) as being anticipated by La et al US 5320250.

The instant claims are directed towards a method of jetting droplets of a viscous medium onto a substrate comprising of: Providing a nozzle, feeding a viscous medium, and impacting said viscous medium thereby jetting the medium towards the substrate.

La et al teach a method of jetting drops of viscous material onto a substrate wherein:

A first embodiment of our apparatus includes a reservoir that holds a predetermined volume of a viscous material. A chamber communicates with the reservoir for continuously receiving the viscous material therefrom. The chamber has a flexible resilient diaphragm which forms an exterior wall thereof. An impact mechanism, which may comprise a solenoid actuated hammer, applies a predetermined momentum to the diaphragm to propel a predetermined minute quantity of the viscous material from the chamber through a nozzle at a high velocity. This minute quantity takes the form of a very small jet of fluid. As the impact energy is removed by means of a stop, the sudden decrease of the chamber pressure and the forward momentum of the jet "pinches" the jet to form a droplet, or blob... The diaphragm may be made of a synthetic material or it may be made of a thin metal sheet. In the latter case, a resilient compressible bumper such as an O-ring is provided under the metal sheet to rapidly restore the original configuration of the sheet after being struck by the hammer. The reservoir is preferably pressurized with gas to force the viscous material into the chamber for the purpose of refilling the chamber. Dispensing rates in excess of four blobs per second can be achieved. (col 2, line 45 to col 3, line 3)

For such a system to function, the amount of viscous material fed into the chamber and the amount leaving as drops are inherently dependent upon each other. If the amount entering is greater than the amount leaving, the device will rupture. If the opposite is true, then the chamber will empty be unable to jet.

Per claim 2, dictionary.com defines "corresponding" as "associated in a working or other relationship." As just discussed, the amount of filling in the described embodiment must be dependent on the volume of the droplet, so they are also

associated. Since the size of the droplet is predetermined the amount of filling must be as well. Claim 2 is inherent to the teaching of La et al.

Per claim 4, see figures 3-5, the taught filling opening is on the opposite side from the nozzle, next to the diaphragm(which forms a wall of the chamber), and when the diaphragm configuration is restored the increase in chamber volume will result in the portion of the nozzle space closest to the outlet being free of viscous material. This can be seen clearly in figure 9 of the second embodiment. Per claim 5-7, La teaches a method that includes jetting multiple droplets. After a droplet is jetted, the diaphragm returns to its original position, which as stated for claim 4 reduces the volume of viscous medium in the nozzle space. Furthermore, the anvil requires some time to return to a start position (idle position) and strike again (a pause). La teaches that during this time the chamber is refilled to what is, as discussed previously, a preset degree.

Per claims 9, 10 and 12, for material to be jetted it must first be fed into the chamber, this is accomplished in the La et al process by activating a feeder(pressurizing it), which must occur at some predetermined time and would result in some predetermined pressure that would be required before the material would flow into the chamber. These claims are inherent to the La et al process.

Per claim 19, however controlled (i.e. feeding time or feeding rate) the feeder operation must be controlled to supply the necessary volume of material into the chamber; it is an inherent feature of La et al.

***Claim Rejections - 35 USC § 103***

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

10. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

11. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

12. Claims 3, 13, 14, 20, 21 and 23-25 are rejected under 35 U.S.C. 103(a) as being unpatentable over La et al.



The claims require controlling the filling rate, pressure or duration in order to fill the chamber with an appropriate volume of viscous material so that jetting can occur at some desired rate. Claims 23-25 require controlling the (hammer) impact velocity of the device to produce predetermined and controllable exit velocities for the drops, regardless of size. Specifically, applicant claims the use of higher impact velocities for smaller drops and lower impact velocities for larger drops.

La et al teach the use of a solenoid actuated hammer wherein "an impact mechanism, which may comprise a solenoid actuated hammer, applies a predetermined momentum to the diaphragm for rapidly metering a predetermined minute blob of the viscous material from the chamber through the nozzle"(abstract). The depth of the hammer impact is controlled independently from the solenoid, so the impact velocity is an independent variable controlled by the solenoid energizing signal (col 5, lines 28-42).

It would have been obvious to a person of ordinary skill at the time of invention that these are known user controllable process variables and to adjust them to produce the desired volume of viscous material in the chamber prior to jetting for different jetting sequences. Furthermore, splashing is undesirable for a controlled area deposition process (it reduces the accuracy of the deposition location. It is well known to the art of fluid flow that fluids will splash if they impact a surface at too high of a velocity(see supporting document enclosed in PTO-892 LaBudde et al. US 6589791, when to control their microfluidic dispersing system they teach that if the nozzle velocity of the drops is too high, splashing may result (col 25, lines 1-45)).

It would have been obvious to a person of ordinary skill at the time of invention that these are known user controllable process variables and to adjust them to produce a desired exit velocity, including increasing the impact velocity for small drops and reducing it for large drops in order to limit the exit velocity to a level that would avoid splashing.

One would be motivated to make such modification in order to run the process at as fast a rate as possible without reducing the accuracy of the targeting of the drops.

13. Claim 22 is rejected under 35 U.S.C. 103(a) as being unpatentable over La et al as applied to claim 1 above, and further in view of Berg et al US6450416.

The instant claim is directed to a jetting device with a feed screw being used to feed the viscous medium.

La teaches such a jetting device, but is silent about a feed screw as the feeding mechanism(supra).

However, Berg et al teaches the use of a feed screw on a device for jetting viscous materials. It would have been obvious to a person of ordinary skill in the art at the time of invention to use the feed screw of Berg et al with the method of La et al in order to obtain improved control of the feeding rate (col 2, lines 24-40).

14. Claims 15-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over La et al as applied to claim 1 and 5 above, and further in view of Tzeng et al US 5988526.

The instant claims are directed towards the use of a vacuum to produce gas across the nozzle outlet in order to remove residual viscous material from the nozzle outlet.

La et al teach a jetting device for viscous material and that clogging of the device is a concern(col 2, lines 30-32) , but do not teach the use of a vacuum device to clean the nozzle.

However, Tzeng et al teach a "nozzle that has a vacuum hood which delivers a vacuum to remove residue from the nozzle and exterior of the nozzle" (col 1, lines 14-16). It would have been obvious to a person of ordinary skill in the art at the time of invention to use the vacuum hood of Tzeng et al with the nozzle of La et al. That person would have been motivated to do so to reduce the chance of clogging the nozzle outlet (col 1, lines 24-25) as well as to reduce the chance of dripping the residue onto the substrate (col 2, lines 14-15).

15. In conclusion, a restriction has been required, claims 8, 11 and 20 are rejected by 35 USC112 2nd paragraph for being indefinite, and claims 1-2, 4-7, 9, 10, 12 and 19 are rejected under 35 U.S.C. 102(b), claims 3, 13-18, 20-25 are rejected under 35 U.S.C. 103(a). No current claims are allowable.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to JOEL HORNING whose telephone number is (571) 270-5357. The examiner can normally be reached on 7:30am-5:00pm EST Monday thru Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Vickie Kim can be reached on (571) 272-0579. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

JH

/Vickie Kim/  
Supervisory Patent Examiner, Art Unit 4172